

in years, with their way of life destroyed. Nuttall, whose great glory was to explore the West when it was open only to mountain men, found himself, like them, old before his time in 1841.

TEMPORAL VARIATION

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TAXONOMISTS have learned to watch for several types of intra-specific variation, other than that which involves varieties and subspecies in different geographic regions. Among these are:

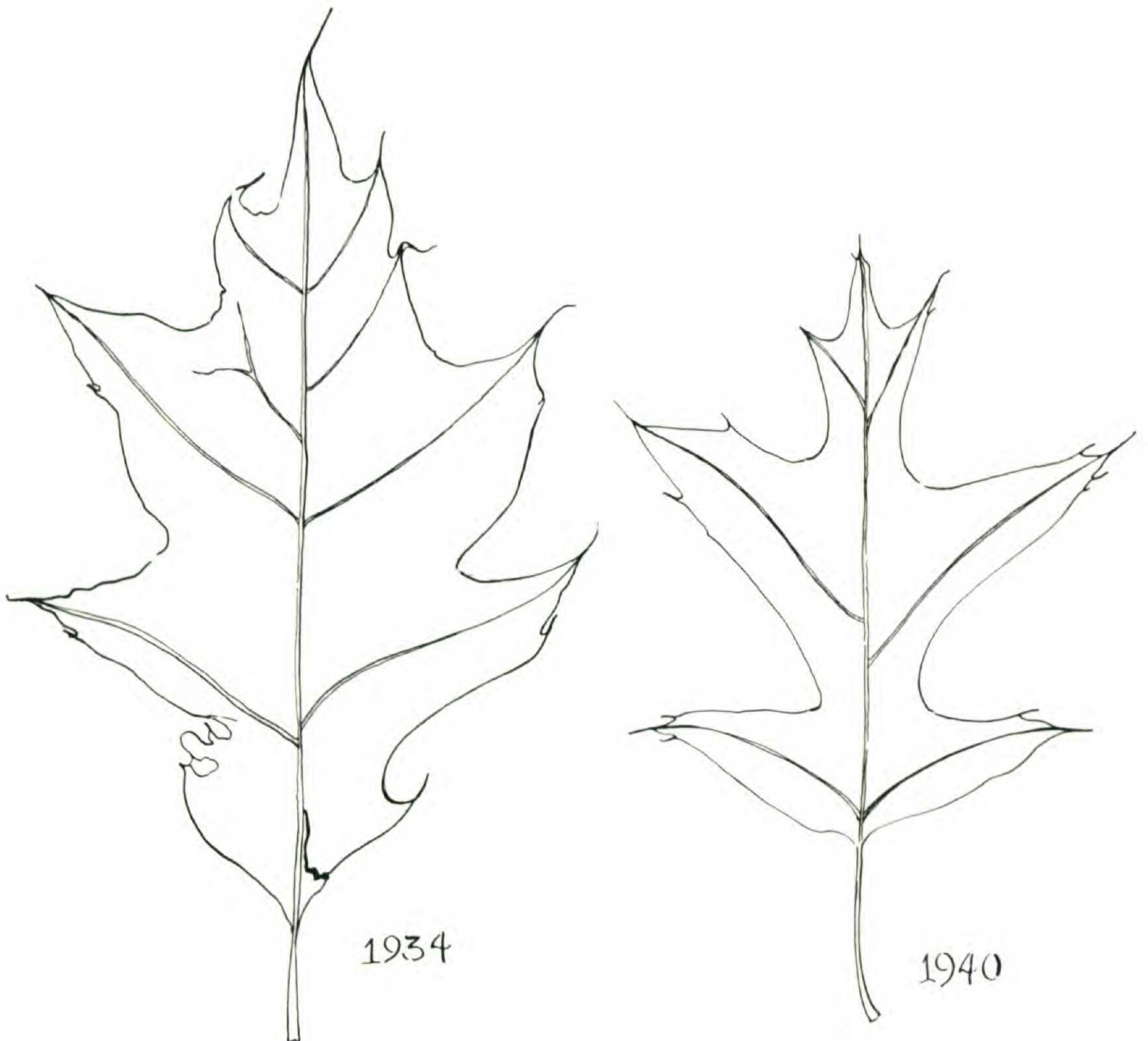
1. *Genetic variation*—the individual, or personal, characters of each plant or clone. This was discussed by Dr. Edgar Anderson for Iris (1928); clonal characters may easily be observed in such plants as *Podophyllum peltatum*, where each clone has a slightly different leaf pattern, in *Rhus typhina* or *R. glabra* where the general nature of the panicle differs slightly from clone to clone, or even in *Geranium maculatum* where close inspection shows a different cutting on the leaves of each clump.

2. *Variation due to habitat*. This is particularly obvious in certain aquatics; a classic example is in the amphibious Polygonums where the aquatic and terrestrial phases of one clone are so different that they were once described as separate species.

3. *Variation on different parts of the same individual*. Foliage may normally be different, for example, on flowering and sterile branches, between sucker shoots and old stems in *Populus*, between juvenile and mature foliage in *Juniperus* or *Eucalyptus*, or on the upper and lower parts of the stem in *Aster cordifolius* and its relatives. The leaf types on different kinds of shoots and at different levels on the same shoot have been discussed in detail by Dr. C. R. Ball (1943).

Less frequently are most of us in a position to observe what might be called:

4. *Temporal variation*, or variation in homologous parts of the same individual in different years. In the herbarium of the always stimulating Dr. C. C. Deam of Bluffton, Indiana, are two sheets, collected in different years, both from the same branch of an oak tree. The one collected in 1934 is a remarkably good match for Fig. 919 in Gray's Manual, ed. 8, representing *Quercus rubra*. In 1940 the same branch had leaves almost as



Figs. 1 and 2. Leaves collected in different years from the same branch of an oak.

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closely matching Fig. 920, *Q. palustris*. In both collections the branches were fruiting. The data on the two labels are as follows:

Flora of Indiana. St. Joseph County. C. C. Deam. *Quercus palustris* DuRoi. No. 55,573, Sept. 14, 1934. A tree about 8 inches in diameter on the north bank of the Kankakee River about 100 ft. west of the Nas-turtium or Mayflower road about $3\frac{1}{2}$ miles southwest of South Bend. On farm of Geo. Dodd. Note that the leaves have very short lobes. Specimen cut with long pruning shears from the tip of long branches. E. J. Palmer says he thinks this is a narrow-leaf form of the species.

Flora of Indiana. St. Joseph County. C. C. Deam. *Quercus palustris* DuRoi. No. 55,573 equals 60,214. Oct. 1, 1940. A tree about 8 inches in diameter on the bank of the Kankakee River near Mayflower Road about $3\frac{1}{2}$ miles southwest of South Bend. The leaves from this

tree taken Sept. 14, 1934, were not lobed to the middle but the leaves are quite normal this year.—DEPARTMENT OF BOTANY, UNIVERSITY OF WISCONSIN.

LITERATURE CITED

- ANDERSON, EDGAR. 1928. *Ann. Mo. Bot. Gard.* 15. 258-260.
BALL, C. R. 1943. *Castanea* 8: 67-71.
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TOVARA IN MEXICO.¹—When the recent monograph on *Tovara* was completed and published in the current volume of *RHODORA*,² material of this genus from Mexico was not then available to its author. Three localities on the eastern escarpment of the Mesa Central are represented in the collections of Dr. H. E. Moore, Jr., and myself.

The Mexican specimens are relatively uniform and although differing from much of *T. virginiana* (L.) Raf. of eastern United States by having smaller leaves (rarely over 10 cm. in length) and roseate calices, they fall within the limits of variation to be found within populations of *T. virginiana*. A collection (*Burns G-39*) in the herbarium of the University of Tennessee from Townsend, Blount County, Tennessee, differs little from the Mexican material except for the paler calyx.

In determining the Mexican collections as to species, much of the Asiatic material of *Tovara* from the Gray Herbarium and the U. S. National Herbarium was examined. It is somewhat difficult to separate *T. virginiana* and *T. filiformis* (Thunb.) Nakai because of the great variability within each and the overlapping of characters. This overlap is indicated by Dr. Li's key. Further collecting may demonstrate that *T. virginiana* and *T. filiformis* are one highly polymorphic species. *T. filiformis* var. *kachina* (Nieuw.) Li and *T. apoensis* (Elmer) Li seem much more distinct.

For the benefit of future workers, the collection data from the Mexican specimens are cited below.

HIDALGO: About Lake Atexco below Molango, 1400 m., *Moore 3478*. Between Tenango de Doria and Santa María Temescalpa, 4000 ft., *Sharp 45943*. Moore's specimens are to be found at the Bailey Hortorium and the Gray Herbarium; Sharp's, in the herbaria of the University of Tennessee and the Instituto Biológico de México. **PUEBLA:** Near Huau-

¹ Contributions from the Botanical Laboratory, The University of Tennessee, N. Ser. 145.

² Li, Hui-Lin. 1952. The Genus *Tovara* (Polygonaceae). *RHODORA* 54: 19-25.